

Workshop **Tools For Inclusive Robotics:** **Ethics, RRI, Taxation & Social Dialogue**

European Robotics Forum

Thursday, 5th of March, 2020

Book of abstracts and presentations

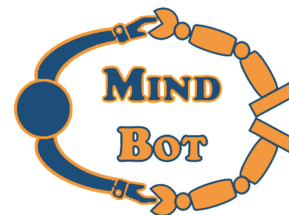
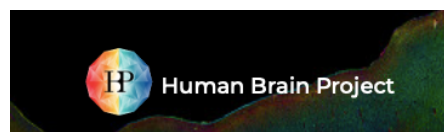
Chairs:

Prof. Juan José Hinojosa Torralvo (Dean, School of Law, University of Málaga) and

Prof. María Amparo Grau Ruiz (Leader of INBOTS WP2, University Complutense of Madrid)



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Tools for inclusive robotics: ethics, RRI, taxation & social dialogue



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Presentation

The **welcome** to this European Robotics Forum (ERF) Workshop held at Trade Fairs and Congress Center of Málaga, on the 5th of March 2020, was given by **Prof. María Amparo Grau Ruiz**, Leader of the WP2 of the INBOTS project, on behalf of both co-Chairs. She explained that this Workshop was organized to continue the debate opened in the previous edition of ERF with of two INBOTS Workshops:

- “Ethics & Corporate Social Responsibility for Inclusive Robotics” (<http://inbotsconference2019.org/workshop-on-ethics-and-corporate-social-responsibility-for-inclusive-robotics/>) and
- “Sustainable Public Policies for Innovation and the Future of Work” (<http://inbotsconference2019.org/sustainable-public-policies-for-innovation-and-the-future-of-work/>).

Their outcome can be found in this publication:

<https://www.dilemata.net/revista/index.php/dilemata/article/view/412000296/646>.

Prof. Grau highlighted the importance of the cooperation with other EU H2020 research projects that participated in this Workshop and contribute to the discussion on Ethical, Legal and Socio-economic aspects. She particularly thanked **Dr. Eduard Fosch-Villaronga**, partner of the Cost Action 16116 on wearable robots, for his unvaluable support to efficiently moderate the workshop on site, despite all the problems caused by the spread of the coronavirus.

According to the announced program, the **First Panel** was composed of the following presentations: “The European approach to AI and robotics” by **Mihalis Kritikos**, European Parliament, and “Responsible Research and Innovation: UNESCO efforts and lessons from the RRING Project”, by **Juliana Chaves Chaparro**, UNESCO.

The **Second Panel** comprised the following presentations: “Social assessment framework of robotic applications” by **Saskia Maresch**, DIN; and “Ethics and Privacy in inclusive robotics” by **Ricardo Morte Ferrer**, Data Protection and IT-Security Consultant.

The **Third Panel** was composed of the following presentations: “Exploring how existing governance arrangements (or its lack) encourage or discourage research and translation of emerging nanorobotic implants” by **Saheli Datta Burton**, Human-Brain Project; “Researching the impact of mental health in human-cobot interaction in industry from an anthropological point of view with the goal of allowing more inclusion for autistic workers” by **Nadine Bender**, MindBot project; and “How the tax systems can support RRI, skilling and sustainable translational outcomes” by **Amparo Grau**.

The **take-away message and the closing remarks** were made by **Dr. Eduard Fosch-Villaronga** and **Prof. Grau**, who thanked all the attendants for their presence and the speakers for their brilliant work on these topics.

Although the order of oral presentations was changed so as to allow several speakers' remote connections from different countries, this publication follows the plan of the initial program.

An interactive part with the audience took place in the middle of the session, as initially planned in the agenda. It was devoted to present the INBOTS survey that was opened during the Conference and will be available for several months after it to allow further bidirectional communication with the AI and robotics community on ELSE issues.

As a reader interested in this field, we would appreciate if you spared some of your time to take it. This will make it possible for us to capture broader views in the White Paper that INBOTS will deliver to the European Commission for the Regulation of Interactive Robotics in the European Union. This is the link to the survey:

<http://inbots.eu/inbots-experts-community/legal-ethics-socio-economics-aspects/else-robotics/>

Thank you for caring about all the challenges that the wise adoption of technologies can pose to our society.

In addition, I want to express publicly my gratitude to the INBOTS partners that supported this Workshop with their input: DIN as leader of WP4, with whom the interaction has proved very enriching, and the Instituto de Filosofía del CSIC, for their continued strong involvement in our project, as shown also in the INBOTS documentary video:

<https://www.youtube.com/watch?v=h0QjNC8XQ1U&feature=youtu.be>

Lastly, I want to thank my team at the UCM, deeply convinced that a respectful debate of every position today will help to better shape our future; additionally, I thank Álvaro Falcón and Mabel López Medina for their support in the publishing process of this Eprint UCM that will allow us to disseminate good ideas in open access to promote more critical thinking, particularly necessary nowadays at a world level, so we can progress together towards common Sustainable Development Goals.

Prof. María Amparo Grau Ruiz

Survey on Tools For Inclusive Robotics

Ethics, RRI, Taxation & Social Dialogue

At INBOTS we are concerned about different views on the ethical, legal and socio-economic implications of interactive robotics. We have been gathering knowledge about how to best develop technology under a Responsible Research & Innovation Paradigm. We are elaborating proposals for a White Paper on the regulation of interactive robotics to be delivered to the European Commission. In this survey you can give us your feedback and opinion. Make sure your voice is heard.



<http://inbots.eu/inbots-experts-community/legal-ethics-socio-economics-aspects/else-robotics/>

Information about this INBOTS Workshop at ERF2020 can be found on the following website:

<http://inbots.eu/event/erf-workshop-tools-for-inclusive-robotics-ethics-rri-taxation-social-dialogue/>

Further information on the organizers' research projects can be found on the following institutional websites:

<http://inbots.eu>

https://www.eu-robotics.net/robotics_forum/

<https://wearablerobots.eu>

Program

10:45 – 10:50

Welcome from our research projects

10:50 – 11:10

EU & UNESCO perspectives

11:10 – 11:30

Standards for social responsibility & regulations to protect privacy

11:30 – 11:40

Open voting & discussion

11:40 – 12:00

- How governance arrangements encourage translation of research outcomes (on implants)?
- Can robots be used to match (autistic) workers' abilities in SMEs?
- How can the tax systems support sustainable robotics and AI?

12:00 – 12:10

Open voting & discussion

12:10 – 12:15

Concluding remarks

Moderators

Eduard Fosch

BIO

Dr. Fosch-Villaronga is a Marie Skłodowska-Curie Postdoctoral Researcher at the eLaw Center for Law and Digital Technologies at Leiden University and the co-leader of the Ethical, Legal, and Societal Aspects Working Group at the H2020 Cost Action 16116 on Wearable Robots. Eduard investigates legal and regulatory aspects of robot and AI technologies, with a special focus on healthcare. Eduard recently published the book 'Robots, Healthcare, and the Law. Regulating Automation in Personal Care' with Routledge and is interested in human-robot interaction, responsible innovation, and the future of law. Previously, he worked as a researcher at the Microsoft Cloud Computing Research Center at Queen Mary University of London (2018) investigating the legal implications of cloud robotics; and at the University of Twente (2017) as a postdoc, exploring iterative regulatory modes for robot governance. Eduard Fosch-Villaronga holds an Erasmus Mundus Joint Doctorate in Law, Science, and Technology coordinated by the University of Bologna (2017), an LL.M. from University of Toulouse (2012), an M.A. from the Autonomous University of Madrid, and an LL.B. from the Autonomous University of Barcelona (2011). Eduard is also a qualified lawyer in Spain.

Vincent Müller

BIO

Professor Vincent C. Müller is Professor for Philosophy of Technology at the Technical University of Eindhoven (TU/e), University Fellow at the University of Leeds and Turing Fellow at the Alan Turing Institute, London – as well as President of the European Society for Cognitive Systems and Chair of the euRobotics topics group on ‘ethical, legal and socio-economic issues’. He is known for his research on theory and ethics of disruptive technologies, particularly artificial intelligence. He has published more than 40 academic papers as well as 16 edited volumes on the philosophy of AI and cognitive science, philosophy of computing, philosophy of language, applied ethics, etc. (citations: h-15). He is principal investigator of “Inclusive Robotics for a Better Society” (INBOTS) at University of Leeds and on the large platform project AI4EU. He is a senior participant on the NL ‘Gravitation’ grant on the “Ethics of Disruptive Technologies”.

Abstracts

MIHALIS KRITIKOS

(Slides of the presentation on page 22)

“The European approach to AI and robotics”

A wide range of countries and international organisations have adopted AI initiatives and the European institutions are no exception. The various EU initiatives focus on ethics and the human aspects of AI which is in line with what is often cited as the ‘European approach’ of aligning AI development with social values. The talk will examine these initiatives as shapers of an EU governance framework on Artificial Intelligence (AI). Special attention will be paid to the ethical and legal aspects of these policy actions for the governance of this disruptive technological sector. The session will discuss whether the pervasive, growing and transformative character of these technologies fits well with the established EU institutional and legal acquis and whether might succeed in its attempts to design our values into AI and robotics.

Author information

Dr Mihalis Kritikos is a Policy Analyst at the European Parliament working as a legal/ethics advisor on Science and Technology issues (STOA/EPRS) and Fellow of the Law Science Technology & Society Programme of the University of Brussels (VUB-LSTS). Mihalis is a legal expert in the fields of EU decision-making, legal backcasting, food/environmental law, the responsible governance of science and innovation and the regulatory control of new and emerging risks. He has worked as a Research Programme Manager for the Ethics Review Service of the European Commission, as a Senior Associate in the EU Regulatory and Environment Affairs Department of White and Case (Brussels office) and as a Lecturer at several UK Universities and a Lecturer/Project Leader at the European Institute of Public Administration (EIPA). He also taught EU Law and Institutions for several years at the London School of Economics and Political Science (LSE). He holds a Bachelor in Law (Athens Law School), Master degrees in European and International Environmental Law and Environmental Management (University of Athens and EAEME respectively) and a PhD in European

Risk Regulation (London School of Economics-LSE). In 2008 he won the UACES Prize for the Best Thesis in European Studies in Europe.

JULIANA CHAVES CHAPARRO

(Slides of the presentation on page 35)

“Responsible Research and Innovation. UNESCO efforts and lessons from the RRING Project”

Whilst research and innovation are presented to have a positive impact on society, projected innovations often do not reach expected social impacts and contribution to development agendas. The [UNESCO Recommendation on science and scientific research \(RS/SR\)](#) approved by its 195 member states in 2017, represents an unique normative and benchmarking document that promotes more ethical, inclusive, meaningful and Responsible Research and Innovation (RRI) and reinforced scientific researchers status over the world to address the Sustainable Development Goals (SDG's). In this same line, the RRI Networked Globally ([RRING](#)) H2020 project monitors RRI globally and incorporates cultural and contextual elements to support RRI competitive advantage, UNESCO RS/SR implementation and SDG's attainment (WP 6 lead by UNESCO) in all regions. RRING lessons can help to showcase advantages, limitations, and challenges of the RRI approach in other high socio-economic impact sectors as robotics.

Author information

Ms. Juliana Chaves-Chaparro, MSc in Environmental sciences and PhD fellow on Sociology, is senior consultant to UNESCO to promote the science-policy-society thorough i.a. RRI and Sustainability science projects. With extensive experience in the co-design and assessment of research and innovation in developing countries and in the sub-Saharan Africa in particular, she has recently produced a UNESCO open access publication presenting five national case studies and extracting policy guidance on how to promote a more inclusive, interdisciplinary and action oriented science in the region: [“Co-designing science in Africa: first steps in assessing the sustainability science approach from the ground”](#).

SASKIA MARESCH

(Slides of the presentation on page 41)

“Social assessment framework of robotic applications”

The aim of standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade. But doesn't standardization also have a social responsibility? Should the standardization system only focus on technical barriers or also societal issues? Social responsibility means the incorporation of social and sustainable considerations in companies and their accountability for it (buzzwords: misuse, trust, accountability, transparency, diversity, dignity). Currently all robotics related standards focus on performance criteria's, test methods and in general physical safety issues, but none on social responsibility. Only the overarching “ISO 26000:2010 Guidance on social responsibility” and “ISO Guide 82:2014 Guidelines for addressing sustainability in standards” exist. Against this background a potential social assessment framework from crisis management will be introduced and its transformation to other robotic application domains will be discussed with the workshop participants.

Author information

Saskia Maresch is a Project Manager in the Innovation department at DIN and has a M.Sc. in Industrial Engineering from the Friedrich-Alexander University of Erlangen-Nuremberg. Her area of responsibility is the management of national and European research and development projects in the field of standardization, e.g. in issues of energy, crisis management, city resilience and robotics (e.g. FIAixEnergy, SMR, COROMA, INBOTS, DRIVER+).

RICARDO MORTE FERRER

(Slides of the presentation on page 50)

“Ethics and Privacy in inclusive robotics”

New technologies, such as robot companions, smart screen assistants, or wearable technology with sensors that record physiological variables to monitor habitual patterns of life, are suggested as devices that promote personal autonomy. The recorded data, once processed, can offer information about health, habits, etc., and allow, in principle, to make more autonomous decisions about one's own well-being and quality of life. But this technological scenario claims an extreme protection of personal autonomy too. Health monitoring could impact privacy, identity, integrity, and the protection of personal data. Therefore, it is necessary to broaden the ethical reflection: from the UN Convention to the relevant regulations on privacy and data protection (RGPD and Draft Privacy Regulation ePrivacy) and the Data Protection Impact Assessment (DPIA) provided in art. 35 RGPD, which is especially relevant for the realm of assistive technologies. All these regulations have the essential goal to protect the affected individuals in the asymmetric power relations in which they are faced with the organizations and governments that develop, implement, and manage assistive technologies. In this kind of relationship, it seems especially important to ensure the effective protection of the personal autonomy of the data subjects.

Author information

Ricardo Morte Ferrer is a Lawyer, Data Protection and IT-Security Consultant. He is a member of the board at LI²FE (Laboratorio de Investigación e Intervención Filosófica y Ética), of the German Working Group for the Standard Data Protection Modell (SDM) and of the Working Group Digitalization and Health at the German Academy for Ethics in the Medicine (AEM).

SAHELI DATTA BURTON

(Slides of the presentation on page 61)

“Exploring how existing governance arrangements (or its lack) encourage or discourage research and translation of emerging nanorobotic implants”

Emerging nanorobotic implants hold immense promise for medicine and health. Implantable brain-computer interfaces are increasingly used in neuro-prostheses and brain-controlled exoskeletons with primary aims of rehabilitating patients with impaired mobility. Emerging motile-implants –that is nanorobotics enabled motile nanoparticles performing specific in-vivo tasks such as targeted drug-delivery or incisions– promise to replace costly invasive surgeries and systemic (whole body) therapies such as chemotherapy with targeted therapeutics. A key characteristic of these emerging artefacts is that they will have some level of autonomy to perform tasks and will communicate with a human or artificially intelligent agent external to the host’s body. This suggests substantial ethical and philosophical issues. How existing governance arrangements (or its lack) encourage or discourage research and translation of these emerging artefacts? Governance perspectives not only include regulatory arrangements for translating research from bench to bedside but also the organisation of interdependent infrastructures such as funding mechanisms, skills availability and entrepreneurial support. Questions also arise around biocompatibility and safety issues linked to RFID-tracking/hacking/data privacy. Importantly, how society responds and engages with these speculations (e.g. governing (motile) implants as molecules and cells) or even the attendant regulatory uncertainties, have implications for translational outcomes. What is needed (e.g. policy changes) to routinise these artefacts into practice for the benefit of society?

Author information

Saheli Datta Burton is a Research Fellow, at the Department of Science, Technology, Engineering and Public Policy (UCL STEaPP), University College London, a Visiting Research Fellow at the Department of Politics, University of Vienna, and Editor of Science and Technology Studies, the house journal of the European Association for the

Study of Science and Technology. Previously, Saheli was a postdoctoral STS scholar at the Department of Global Health and Social Medicine at King's College London. Saheli's research considers the socioethical and international politiceconomic issues of emerging technologies in health and medicine specifically focusing on regenerative medicine, data-driven health and (recently) robotics-assisted nanomedicine.

NADINE BENDER

(Slides of the presentation on page 70)

“Researching the impact of mental health in human-cobot interaction in industry from an anthropological point of view with the goal of allowing more inclusion for autistic workers”

In order to contribute to the workshop session, the new H2020 project MindBot will be introduced to the workshop participants. In the MindBot project a very multi-disciplinary consortium aims to promote mental health of cobot workers in industry 4.0 and to hither promote strategies for the support of mental health in human-robot interaction. The primary objective of the project is to intervene on technological, relational and organizational aspects of the cobot-based work, in order to match the cobots work to the workers ability. To reach this goal, the inclusion of autistic workers as experts is also part of the project. The presentation will focus on the different phases of the project, methods used and the challenges presented in the project regarding ethical questions and the protection of worker’s privacy rights, also connected to the special focus of the project: Integration of people with autism into the workforce of SMEs.

Author information

Social scientist working at KUKA’s Corporate Research department. There her research focus is on social impacts of robotics, specifically ethical and psycho-social issues in the human-robot interaction. She received her bachelor degree in Social Sciences in 2011 at University of Augsburg which qualified her for a DAAD (German Academic Exchange Service) full scholarship to study the Master’s degree “International Financial and Political Relations” in Loughborough, UK. In December 2012, she graduated with a distinction, while she had already started working at the Chief Innovation Office at KUKA AG in November 2012. There her focus was the scientific research of a widespread field of robotics related topics, thus preparing the content layer of several presentations and strategic papers. In September 2015 Nadine joined the Project Office of KUKA’s Corporate Research department; first as support for the RockEU and

RockEU2 projects and since 2017 as analyst of social impacts of robotics. Here she has been actively contributing to the integrated technology development process and for example written analyses for both European and national research projects like REFILLS, MURAB and RoSylerNT. With the start of 2020, she is leading the new H2020 project MindBot at KUKA and is contributing further to the development of the personal transfer assistant in hospitals, PeTRA (German funded project).

AMPARO GRAU

(Slides of the presentation on page 74)

“How the tax systems can support RRI, skilling and sustainable translational outcomes”

Funding, either from public or private sources, is needed to finance any sustainable development-oriented policy. Its implementation in the field of robotics and AI, as a mainstream strategy, calls for the discussion of clear common guidelines. In this sense, some parts of the current tax systems could be reviewed in order to cope with the newest societal aspirations expressed in the Global Agenda. The design of controllable tax incentives could rely on the smart use –with intelligent robots- of relevant Big data for Environmental, Social and Governance purposes. This might serve to give a more efficient joint response to several international problems. Could companies and Public Finance incorporate these features in their lines of action?

Author information

Full Professor of Financial and Tax Law, Complutense University of Madrid. Visiting Professor of Transnational Taxation, Northwestern University. Principal Investigator at the UCM of the EU project H2020 “Inclusive Robotics for a Better Society (INBOTS)” and leader of its WP2 on ethical, legal, social and economic issues. Principal Investigator of the CertificaRSE MINECO-FEDER project on “Legal-Financial Effects, And Control Of The Social Impact For Sustainable Development” (DER2015-65374-R). Leader of the Research Group 970774 IUS-SustentaRSE “Law for Sustainable Development”. Member of the Subcommittee on Environmental Taxation, appointed by the UN Committee of Experts on International Cooperation in Tax Matters.

Presentations

“The European approach to AI and robotics”



THE REGULATION OF ROBOTICS & AI IN EUROPE:
LEGAL, ETHICAL AND ECONOMIC IMPLICATIONS
INTERNATIONAL SUMMER SCHOOL | 1 - 6 JULY 2019, PISA, ITALY



Artificial intelligence in the EU: major initiatives and preliminary reflections

Dr Mihalis Kritikos
Scientific Foresight Unit (STOA)
DG EPRS, EP

5 March 2020, Malaga-ERF

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Designing a legal framework for AI

- Inclusive and up-to-date definitions
- Variation of regulatory approaches
 - Public, top-down
 - Compliance-oriented
 - Smart law
- AI rules and the protection of fundamental rights

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Core principles of AI law

- Loyalty
- Transparency
- Obligation of due diligence
- Data quality
- Safety

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REPORT on Civil Law Rules on Robotics(2015/2103(INL))

Rapporteur: Mady DELVAUX (S&D/LU)

EP reference number: A8-0005/2017 / P8_TA-PROV(2017)0051

Date of adoption of the resolution: 16 February 2017

Subject: **An extensive set of recommendations to create an EU framework for the liability, design, development, testing, production, market introduction, exploitation and use of cyber physical systems, autonomous systems and smart autonomous robots.**

Competent Parliamentary Committee: **Committee on Legal Affairs (JURI)**

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REPORT on Civil Law Rules on Robotics-Main issues

Recommends to the Commission a whole range of legislative and non-legislative initiatives in the field of robotics and artificial intelligence

- *general principles concerning the development of robotics and artificial intelligence for civil use,*
- *research and innovation,*
- *ethical principles,*
- *a new European agency,*
- *standardisation,*
- *safety and security,*
- *liability,*

It asks the Commission to submit a **proposal for a legislative instrument providing civil law rules on the liability of robots and artificial intelligence.**

Resolution of the EP: Main points

- Calls **for inclusive EU-wide definitions of cyber physical systems, autonomous systems and smart autonomous robots.**
- Proposes **an EU-wide registration system for more advanced categories of robots** under the control of a new Robotics and AI agency.
- Need for **new rules on liability for damage**
(current EU system of strict liability for products is inadequate/introduction of a risk-management approach (based on absolute liability rules), holding liable the party who is better placed to minimize the cost and acquire insurance.

Resolution of the EP: Main points

- A **compulsory insurance scheme** like that for vehicles may be needed.
- Need for a **coordinated approach to regulating autonomous vehicles** where many issues ranging from safety, energy efficiency, data collection and use to unemployment are brought into sharp focus.
- Need for **further standardization** to ensure high levels of product safety and provide certainty ex ante to manufacturers who conform to them.
- Introduction of the **notion of Electronic Personhood** for facilitating the registration, insurance and management of some devices (in particular non-embodied AI)

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05/03/2020

Resolution of the EP: Main points

- Calls for **inclusive EU-wide definitions of cyber physical systems, autonomous systems and smart autonomous robots.**
- Need for an EU-wide definition of robots;
- Proposes **an EU-wide registration system for more advanced categories of robots** under the control of a new Robotics and AI agency.
- Need for **new rules on liability for damage**
(current EU system of strict liability for products is inadequate/introduction of a risk-management approach (based on absolute liability rules), holding liable the party who is better placed to minimize the cost and acquire insurance.

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General and ethical principles

The resolution establishes general as well as ethical principles concerning the development of robotics and AI for civil use.

Research in robotics and ICT as well as in the implications of their dissemination should be strengthened.

A Charter on Robotics is annexed to this resolution.

This Charter consists of:

***a Code of Ethical Conduct for Robotics Engineers,
a Code for Research Ethics Committees and
Licenses for Designers and Users***

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REPORT on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI))

Rapporteur: **Ashley FOX (ECR/UK)**

Date of adoption of the resolution: 12 February 2019

Subject: **acknowledges the potential for AI and robotics to lead new business models, transform societies, and digitize the economy in a number of sectors including public sector, health, energy, agriculture, and transportation**

Competent Parliamentary Committee: **Committee on Industry, Research and Energy (ITRE)**

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European Parliament resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI))

— **Recognition of the potential of AI, machine learning, big data and robotics and personalised healthcare**

— **EU world-leader in healthcare technologies**

-Calls on the Commission to work on strategies and policies that can position the EU as a world-leader in the growing field of health care technology.

— **More transparency for citizens on AI use**

-Notes that citizens are concerned about not knowing when AI is being used and what information will be processed and therefore recommends that there is clear disclosure when AI is used.

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Legal framework for artificial intelligence and robotics

- Calls on the Commission to regularly re-evaluate current legislation to ensure that it is fit for purpose with respect to AI while also respecting EU fundamental values;
- Welcomes the setup of AI-based participative platforms;
- Considers that a comprehensive law or regulation on AI should be approached with caution;
- Stresses that the policy framework must be designed to encourage the development of all kinds of AI;

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Ethical aspects

- Calls for **the creation of an ethical charter of best practice for AI/robotics that companies and experts should follow;**
- Stresses that **ethical rules must be in place to ensure human-centric AI development, the accountability and transparency of algorithmic decision-making systems, clear liability rules and fairness;**
- Calls on the Commission to **ensure the largest possible uptake of those ethical guidelines;**
- Recommends that **Member States incorporate the guidelines into their national AI strategies and develop real accountability structures;**
- Calls on the Commission to analyse **whether the voluntary ethical guidelines are sufficient to ensure that the inclusive, ethically embedded uptake of AI does not generate economic and social divides;**
- Notes the **recent developments in monitoring and adapting to behavioural analytics;** calls on the Commission to develop an ethical framework that limits its use;

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Embedded values in technology – ethical-by-design

- Points out that **the guiding ethical framework should be based on the principles of beneficence, non-maleficence, autonomy and justice, on the principles and values enshrined in Article 2 of the Treaty on European Union and in the Charter of Fundamental Rights;**
- Recommends that the **Member States establish AI ethics monitoring and oversight bodies and encourage companies developing AI to set up ethics boards and draw up ethical guidelines for their AI developers;**
- Stresses that **European standards for AI must be based on the principles of digital ethics, human dignity, respect for fundamental rights, data protection, and security, thus contributing to building trust among users;**
- Notes that **automated weapons systems should continue to have a human-in-command approach to artificial intelligence;**

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Decision-making – limits to the autonomy of AI/robotics

- Calls for people to have a right to know, **a right of appeal and a right to redress when AI is used for decisions affecting individuals which carry a significant risk to an individual's rights or freedom or may cause them harm;**
- Stresses that algorithms in **decision-making systems should not be deployed without a prior algorithmic impact assessment (AIA)**, unless it is clear that they have no significant impact on the life of individuals;
- Believes that artificial intelligence, especially systems with built-in autonomy, including the capability to independently extract, collect and share sensitive information with various stakeholders, and the possibility of self-learning or even evolving to self-modify, **should be subject to robust principles;**

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Main legal 'initiatives'

- **European Parliament, Resolution on Civil Law Rules on Robotics**, 16 February 2017
- **European Commission, Commission publishes mid-term review of the 2015 Digital Single Market strategy**, 10 May 2017
- **European Economic and Social Committee, Opinion on the consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society**, 31 May 2017
- **European Council, European Council meeting Conclusions**, 19 October 2017
- **Declaration of Cooperation on Artificial Intelligence**, 10 April 2018
- **European Commission, Communication on Artificial Intelligence for Europe**, 25 April 2018
- **European Parliament Resolution on a comprehensive European industrial policy on artificial intelligence and robotics** ([2018/2088\(INI\)](#)), 12 February 2019
- **European Commission, Communication on Building Trust in Human-Centric Artificial Intelligence**, Brussels, 8.4.2019 COM(2019) 168 final

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Statement on Artificial Intelligence, Robotics and 'Autonomous' Systems, 9/3/2018

European Group on Ethics on Science and New Technologies

calls upon the European Commission to **launch and support the implementation of a wide-ranging and systematic public engagement and deliberation on the ethics of AI;**

proposes a set of basic principles and democratic prerequisites, based on the fundamental values laid down in the EU Treaties and in the EU Charter of Fundamental Rights;

calls upon the European Commission **to investigate which existing legal instruments are available to effectively deal with AI-related challenges** and whether new governance and regulatory instruments are required;

calls for the **launch of a process towards a common, internationally recognised ethical and legal framework** for the design, production, use and governance of AI;

EPRS | Presentation Title

05/03/2020



High Level Group on Artificial Intelligence

In June 2018, the Commission appointed **52 experts to a new High Level Group on Artificial Intelligence, comprising representatives from academia, civil society, as well as industry.**

In particular, the group was tasked to:

- **Advise the Commission on next steps addressing AI-related mid to long-term challenges and opportunities through recommendations;**
- **Propose to the Commission draft AI ethics guidelines, covering issues such as fairness, safety, transparency, the future of work, democracy and more broadly the impact on the application of the Charter of Fundamental Rights;**
- **Support the Commission on further engagement and outreach mechanisms;**

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HGLG -AI Guidelines

According to the guidelines, trustworthy AI should be:

- (1) lawful - respecting all applicable laws and regulations**
- (2) ethical - respecting ethical principles and values**
- (3) robust - both from a technical perspective while taking into account its social environment**

EPRS |

7 key requirements

- **Human agency and oversight:** AI systems should empower human beings, allowing them to make informed decisions and fostering their fundamental rights.
- **Technical Robustness and safety:** AI systems need to be resilient and secure.
- **Privacy and data governance:** besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, taking into account the quality and integrity of the data, and ensuring legitimised access to data.
- **Transparency:** the data, system and AI business models should be transparent.

EPRS |

7 key requirements

- **Diversity, non-discrimination and fairness:** Unfair bias must be avoided, as it could have multiple negative implications, from the marginalization of vulnerable groups, to the exacerbation of prejudice and discrimination.
- **Societal and environmental well-being:** AI systems should benefit all human beings, including future generations.
- **Accountability:** Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes.

EPRS |

HGLG -AI Guidelines

— Next Steps

- A piloting process will be set up as a means of gathering practical feedback on how the assessment list, that operationalises the key requirements, can be improved. All interested stakeholders can already [register their interest](#) to participate in the piloting process that will be kicked-off in summer 2019
- Moreover, a [forum discussion was set up to foster the exchange of best practices](#) on the implementation of Trustworthy AI.
 - Following the piloting phase and building on the feedback received, the High-Level Expert Group on AI will review the assessment lists for the key requirements in early 2020. Based on this review, the Commission will evaluate the outcome and propose any next steps.

EPRS |

Political Guidelines for the Next European Commission

— A Europe fit for the digital age

To lead the way on next-generation hyperscalers, we will invest in blockchain, high-performance computing, quantum computing, algorithms and tools to allow data sharing and data usage. **We will jointly define standards for this new generation of technologies that will become the global norm.**

- In order to release that potential we have to find our European way, balancing the flow and wide use of data while preserving high privacy, security, safety and ethical standards. We already achieved this with the General Data Protection Regulation, and many countries have followed our path.
- **In my first 100 days in office, I will put forward legislation for a coordinated European approach on the human and ethical implications of Artificial Intelligence.** This should also look at how we can use big data for innovations that create wealth for our societies and our businesses.
- I will make sure that we prioritise investments in Artificial Intelligence, both through the Multiannual Financial Framework and through the increased use of public-private partnerships.
- A new **Digital Services Act** will upgrade our liability and safety rules for digital platforms, services and products, and complete our Digital Single Market.

EPRS |

White Paper on AI-European Commission

- Framework for trustworthy Artificial Intelligence, based on excellence and trust.
- Clear rules need to address high-risk AI systems without putting too much burden on less risky ones. Strict EU rules for consumer protection, to address unfair commercial practices and to protect personal data and privacy, continue to apply.
- For high-risk cases, such as in health, policing, or transport, AI systems should be transparent, traceable and guarantee human oversight.
- Authorities should be able to test and certify the data used by algorithms as they check cosmetics, cars or toys. Unbiased data is needed to train high-risk systems to perform properly, and to ensure respect of fundamental rights, in particular non-discrimination.
- For lower risk AI applications, the Commission envisages a voluntary labelling scheme if they apply higher standards.

EPRS | Presentation Title

05/03/2020

24

European Parliament

- New special Committee on AI
- AI Observatory
- STOA-Center for AI
- 13 own initiative resolutions on AI

Thanks for your attention!

JULIANA CHAVES CHAPARRO

“Responsible Research and Innovation. UNESCO efforts and lessons from the RRING Project”



RRI for inclusive robotics: the global perspective

Juliana Chaves Chaparro, Project officer
Division of Science Policy and Capacity Building
UNESCO HQ Paris
RRING kick off meeting
Cork, 3 May 2018

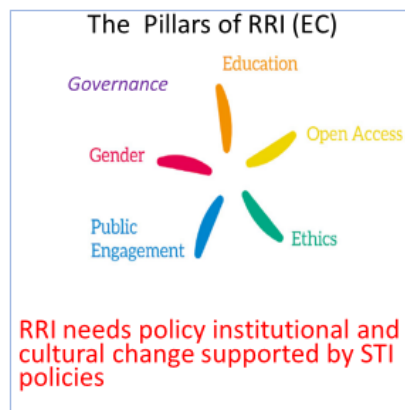


The Universal Declaration of Human Rights (article 27) affirms everyone's **right** to participate in and benefit from **scientific advances**, and be protected from **scientific misuses**. This implies that the benefits of scientific advancement should be shared openly, free from restrictions by social groups, corporate entities or states. Above all, a **rights-based approach to science** seeks to create the conditions for equitable participation in the global science community and fair access to scientific information and goods.

 RRING and GRRIP projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 788503 and No 820283

UNESCO (1945) is the UN agency with a trans-disciplinary (Education, Social and Human Sciences, Natural Sciences, Communication and Culture) mandate to advise the 193 Member States on Science, Technology and Innovation (STI) monitoring (UIS) and governance (STI policies dealing with the status of researchers, ethics of science and technology, science education, gender equality and Open Science to support inclusive knowledge societies enabled to achieve Sustainable Development: RRI pillars).

All are part of the **2017 UNESCO Recommendation on Science and Scientific Researchers (RS/SR)**

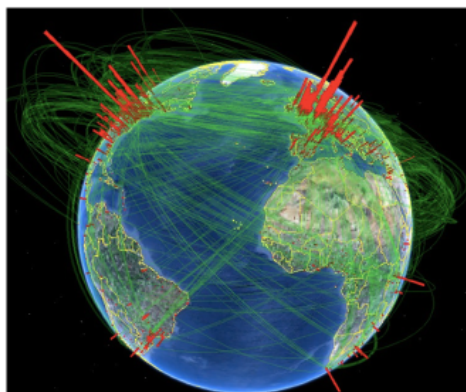
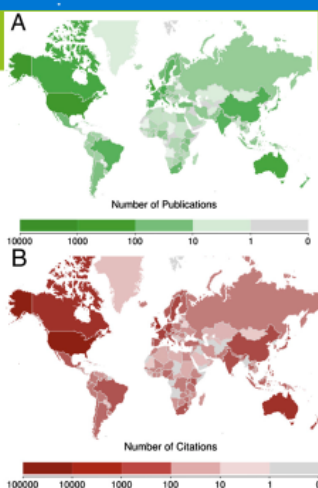


- The [UNESCO RS/SR](#) is a unique global standard-setting instrument which not only codifies the goals and ethical value systems by which science operates, but also emphasizes that these need to be supported and protected by national STI policies.
- This is the first time that a global consensus on science norms codified such a comprehensive set of guidelines, and it is now a threshold for all research systems of the world to meet, in order to enhance international scientific cooperation over the long term.
- The Recommendation reflects high standards for both scientific freedom and responsibility and request 193 UNESCO Member States to provide an enabling STI policy environment to implement it and **ensuring adequate researchers career development prospects and facilities**. This is a prerequisite to RRI according to the *Status of the Art review of RRI projects led by UNESCO D.3.1* [GRRIP](#)
- Adopted as framework of reference for monitoring/implementing RRI processes and Action plans in H2020 Swifts projects : RRI Networked Globally ([RRING](#)) and Grounding RRI in Research Performing Organisations (GRRIP)

2017 UNESCO Recommendation on Science and Scientific Researchers (RS/SR) cont.

- Encourages new entrants and excellence in science: protect researchers' careers and promote freedom with a renewed emphasis on inclusion, social welfare, scientific integrity and ethical codes for research and their technical applications.
- Contemporary challenges such as environmental protection, the encouragement of women in science careers, and handling a transition to greater openness and access to knowledge are meant to be reflected systemically.
- 193 MS will report every 4 years on implementation: develop monitoring models, formulate and execute the most appropriate policy frameworks and institutions and protocols for the practice of responsible STI.
- This Recommendation entails changes which will be made at the national level for its implementation into national policies/practices: policy and institutional changes to be discussed at national dialogues: Ireland and Lithuania trial process under the RRING project

International scientific cooperation needs to better include developing countries and Africa (UNESCO priority) in particular, the region least connected in knowledge production with the rest of the world and where Sustainable Development issues require urgent R&I responses





United Nations
Educational, Scientific and
Cultural Organization



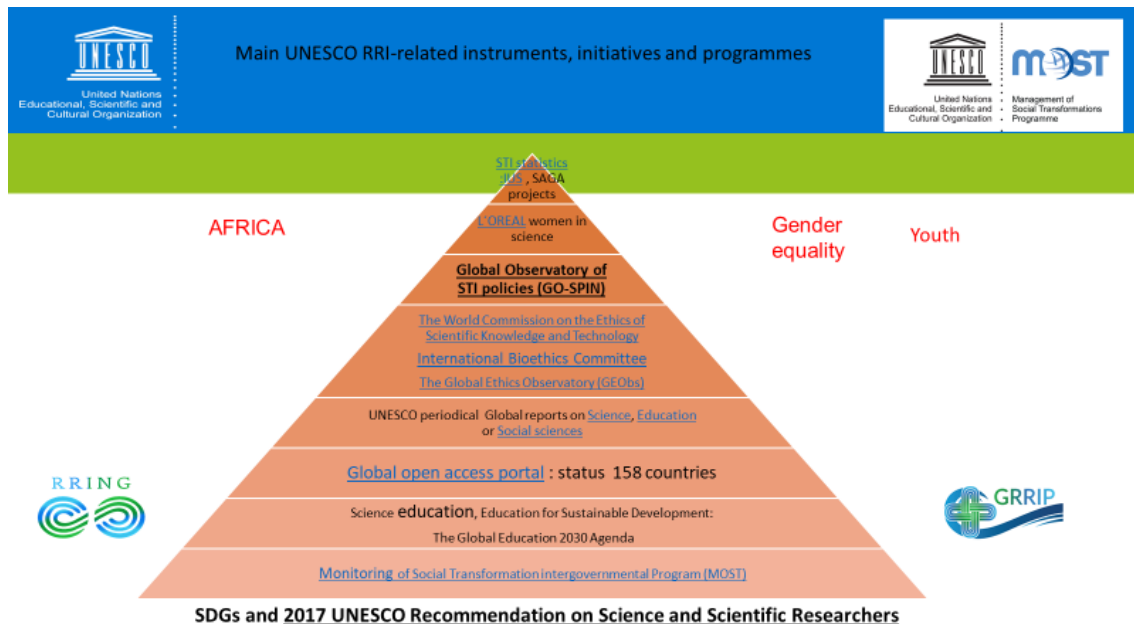
United Nations
Educational, Scientific and
Cultural Organization
Management of
Social Transformations
Programme

UNESCO mandate to improve the science-policy-society interface



- *RRI anticipates and assesses potential implications and societal expectations with regard to R&I, with the aim of fostering the design of inclusive and sustainable R&I →SDGs*
- RRI approach needs to embed regional and contextual specificities and understandings
 - Integrated goals for global sustainability based on scientific evidence
 - Mechanisms to facilitate an interactive, inclusive, fair, equal dialogue on global responsibility among the various regions, stakeholders and the policy-making community at different scales, with adapted mechanisms

This publication was produced under the Sida funded Project to mobilise developing countries capacities for global change research and is available [here](#)



Some general questions to the European Robotics Forum:

some reflections to be found in the UNESCO RS/SR

- How to adapt criteria for researchers' career development from publishing in journals towards better societal engagement and concrete outputs for societal wellbeing ?
- How can AI, and robotics in particular, contribute concretely to sustainable development?
- How to use it for inclusion and to fight biases, notably in the domain of gender equality, discrimination, and to narrow digital divides?
- How to ensure environmental and social sustainability?
- How to ensure ethical use of robotics and AI?
- How to fight brain drain, ensure just opportunities for researchers? Non-discriminatory and gender-equitable use of AI, prevent promotion of inequalities?
- How to solidify international cooperation (including the global South's needs and challenges) to promote inclusion and equal access to AI, robotics and Big Data for SDGs? Global framework to regulate it?
- How to promote taxes for profitable innovation towards other extensive, low-cost applications for developing countries?

Some other questions

HERE ALSO ETHICS OF AI PROCESS SHOULD BE MENTIONED (PRELIMINARY REPORT BY COMEST/IPC ALREADY PUBLISHED – CONSULTATIONS IN PROGRESS NOW)

and some references

- Industrial robotization brings economic and political challenges: could it bring about a new divide between developing and developed countries, and if so, how can we confront this situation?
[2017 COMEST report on robotics ethics](#) : traceability, legal (distributed) responsibility, global justice , inequalities, knowledge and digital divide (N-S), if data is the lifeblood of the robot revolution, then it must also be used to defend and compensate those who might otherwise lose out from these new technologies (OECD, 2016).
 - ON going work (OPEN CONSULTATION HERE) towards Recommendation on Ethics of Artificial Intelligence
 - How to leverage AI to advance inclusion in access to quality learning opportunities? Remote rural areas? Gender? Special needs groups?
 - How to ensure capacity building for new skills? Recycle of workers substituted by AI and robots?
 - Promote non-discriminatory, free of bias and gender-equitable use of AI for learning?
- [2019 AI for Sustainable development](#) - Mobile learning week - 1500 participants 140 countries

Give us your comments NOW!

UNESCO process towards a Recommendation on Ethics of Artificial Intelligence

UNESCO has embarked on a two-year process to elaborate the **first global standard-setting instrument on ethics of artificial intelligence**, following the decision of UNESCO's General Conference at its 40th session in November 2019.

This inclusive and multidisciplinary process will include consultations with a wide range of stakeholders, including the scientific community, people of different cultural backgrounds and ethical perspectives, minority groups, civil society, government and the private sector

The process will build on the preliminary study completed by UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST). This study emphasizes that **currently no global instrument covers all the fields that guide the development and application of AI in a human-centered approach**.

Ad Hoc Expert Group: **24 renowned specialists** with multidisciplinary and pluralistic expertise on the ethics of artificial intelligence have been appointed to produce **a draft of the instrument, in the form of a UNESCO Recommendation**, with due consideration for various dimensions, including the environment and the needs of **the global South**.

The first task to be completed by the AHEG is the preparation of the first version of a draft text by the end of April 2020. This draft will then be submitted for **multi-stakeholder consultations between May and July 2020**.

All information here:

"Caminante no hay camino, se hace camino al andar" A. Machado

j.chaves-chaparro@unesco.org

Let's co-create new paths together



@UNESCO/J.Chaves-Chaparro

“Social assessment framework of robotic applications”

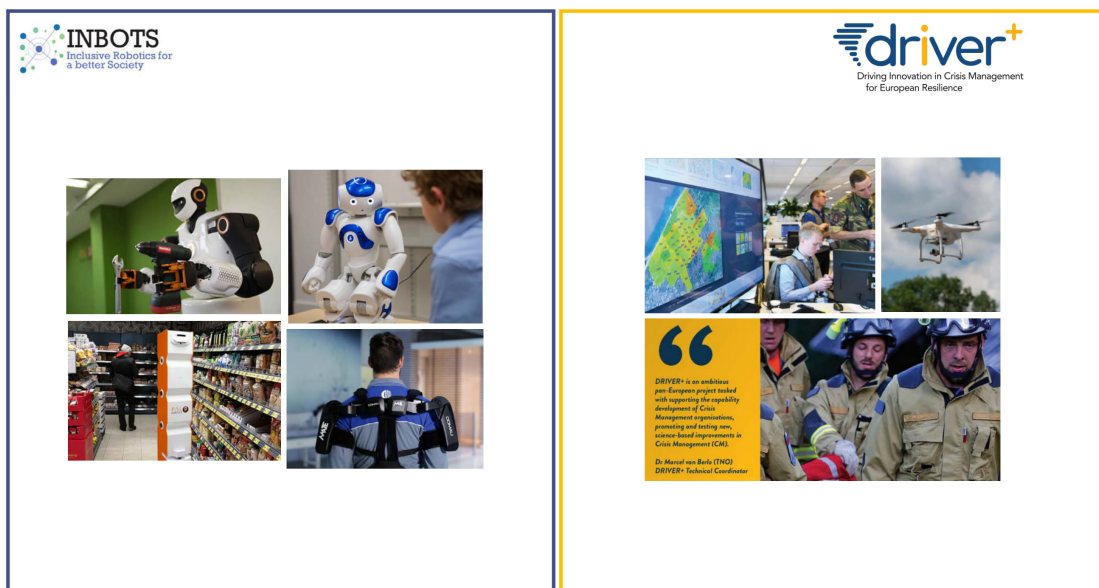


Societal assessment framework for robotic applications

Saskia Maresch
German Institute for Standardization



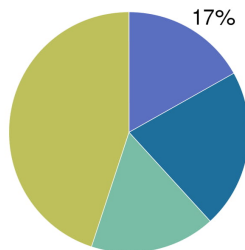
This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073



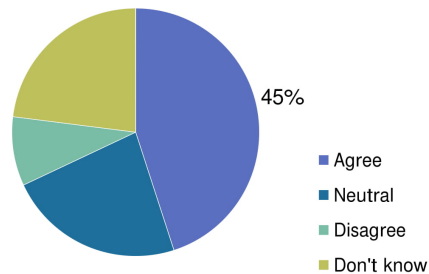
This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

European Robotics Forum 2019

Meaningful RRI and CSR are challenging
to realize for robot companies in practice.



Robotic companies need to pay
more attention to RRI and CSR.



 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

Corporate Social Responsibility & Responsible Research and Innovation

Corporate Social Responsibility

- responsibility of enterprises for their impacts on society
- companies should have in place a process to integrate social, environmental, ethical, human rights and consumer concerns into their business operations and core strategy in close collaboration with their stakeholders
- aim of maximise the creation of shared value for their owners/shareholders and civil society at large and identifying, preventing and mitigating possible adverse impacts

Source: www.inbots.eu

Responsible Research and Innovation

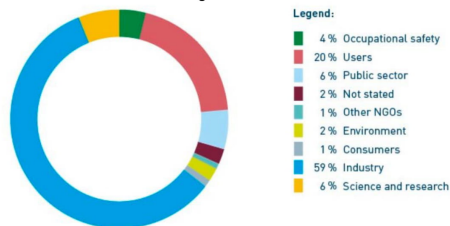
- approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation
- aim to foster the design of inclusive and sustainable research and innovation
- reduce the divide existing between the scientific community and society, encouraging different stakeholders to work together during the entire research and innovation process

Source: www.ec.europa.eu

 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

Published standards on CSR

- ISO 26000:2010 Guidance on social responsibility
Customers also bought:
ISO 13485:2016 Medical devices – Quality management systems – Requirements for regulatory purposes
ISO 9001:2015 Quality management system – Requirements
- ISO 20400:2017 Sustainable procurement - Guidance
- CWA 17145-1:2017 Ethics assessment for R&I - Part 1: Ethics committee
- CWA 17145-2:2017 Ethics assessment for R&I - Part 2: Ethical impact assessment framework
- Composition of the German Standards Committee for Organizational Processes:

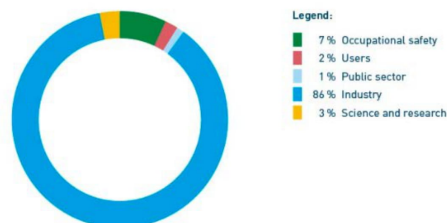


Source: www.din.de/en/getting-involved/standards-committees/naorg

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

German Standards Committee Mechanical Engineering

- Robotics standards are developed by ISO/TC 299 Robotics
- Technical set-up – how can the structure change to be more inclusive?
- Composition of the German Standards Committee for Mechanical Engineering (mirror committee of ISO/TC 299 Robotics):



Source: www.din.de/en/getting-involved/standards-committees/nam

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

ISO/TC 299 Work Programme

As the robotics domain evolves the standardization needs will need to be broadened to take into account a range of issues within the ISO committee for robotics.

These will relate to the following:

- “cultural issues which **may** also become important as the application domains for robots...”
- “**social and ethical aspects**, to be handled by the appropriate TC, which are emerging to be **very important** in many sectors where **robots are used to replace humans**”

Source: www.iso.org/committee/5915511.html

Standardization Principle:

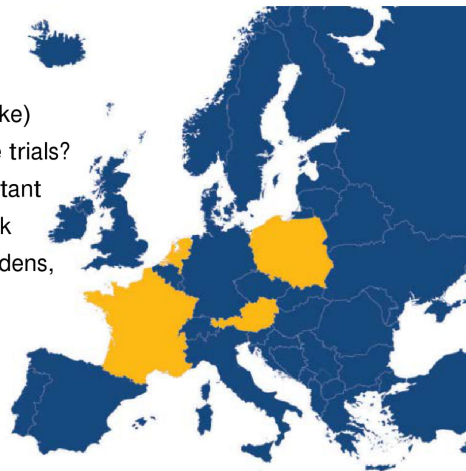
- “Standards always take the needs of society as a whole into consideration. The benefits to the general public take priority over the benefits of individuals.”

Source: <https://www.din.de/en/about-standards/din-standards/principles-of-standards-work>



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

- Different trials (e.g. wildfire, flooding, earthquake)
- What kind of technology should be used for the trials?
- Societal besides technological factors are important
- Development of Societal Assessment Framework
- Maximize solution benefits and minimize its burdens, especially those burdens borne by people



Source: www.driver-project.eu



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

Societal Impact Assessment (SIA)

SIA consists of two main components:

Solution functions, which are the objects which will be assessed.

Set of societal impact criteria, which are what these functions are assessed against.

Applying the SIA follows five basic steps, each containing a set of guiding questions:

0. General description of the solution.
 1. Identify stakeholder groups/communities.
 2. Collect background information.
 3. Get an overview of legislation and policies.
 4. Identify and predict impacts.
 5. Describe mitigating measures and follow up.

 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

0. General description of the solution

- Name of the technical solution
- Example functions from the DRIVER+ portfolio of technical solutions:

Conduct systematic monitoring and data collection

Engage the population

Conduct and coordinate communications and information planning

Manage humanitarian recovery

Support affected people

Conduct operational planning

Manage material logistics

Conduct civil security foresight

Questions

Which **functions** do you want to address?

What is the **purpose** of the function?

Which **activities** is it used in?

Source: <https://pos.driver-project.eu/en/PoS>

 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

1. Stakeholder groups/communities & 2. Background information

Stakeholders that **potentially be impacted by the implementation** of the solution.

Collect information covering **key societal issues of the identified impacted communities** such as community history, culture and key events that have shaped the development of the community.

Questions

How could this specific function that my solution has, has an **impact on the stakeholder** groups or communities?

Who are the stakeholder groups or communities that could **potentially be affected** by the solution?

Questions

Are there known **vulnerabilities** in the community?

Specific social **challenges**? Who are the major industrial actors? Are there **historical reasons** to believe that the community where the solution will be deployed out could find it problematic?

Have there been **controversies** regarding the use of similar solutions in this area/region/country?



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

3. Relevant Legislation and Policies

Questions

- Which **formal restrictions** exist that will influence the use of the solution?
- What are the **policy discussions** in the field?
- Have **new legislations** been introduced to regulate crisis management efforts?
- Are you dealing with a situation where there are **identified gaps in terms of legislation**, e.g. when if you are dealing with new technologies?
- What are the **rules** that you need to follow?



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

4. Identify and predict impacts

List used to structure thinking - not to say something about each criterion.

Which **social impact criterion** could be **relevant for the function** that is being assessed?

Impact categories

1. Secondary in/securities
2. Societal and ethical principles
3. Sustainability
4. Political and administrative principles
5. Legitimacy
6. Legal values and particularly relevant
7. Fundamental rights



 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

5. Mitigation Measures

- **List of measures** should be made in order to lower the risk of negative unintended impacts, and/ or to increase the possibility for positive impact.
- List should be based on the potential impacts identified in the previous step.
- Could include actions such as providing **extra follow ups for volunteers, establish rapport with local community leaders, engaging with the communities, and sharing more information** about the solution at stake.
- A basic plan should be made to describe how the mitigating measures will be followed up on.

 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

Summary

- Diverse research projects and they can learn from each other – communication is key.
- ISO/TC 299 focuses on technical standards and it seems that non-technical experts are lacking.
- Some technologies can be used in more than one application domain – potential transfer of the SIA to other domains.

Open question:

- Should social responsibility be addressed in standards?
- Should standardization organizations initiate activities on social responsibility and leave their neutral role (initiation of the development of a standard typically come from the market)?



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073

Social responsibility should be addressed in standards.

Yes, but only in form of a general guidance without taking into account different application domain (e.g. ISO 26000:2010, ISO Guide 82:2014).

Yes, the functionalities of robotic devices should be evaluated against a social assessment framework (self-evaluation).

No.

Abstention.




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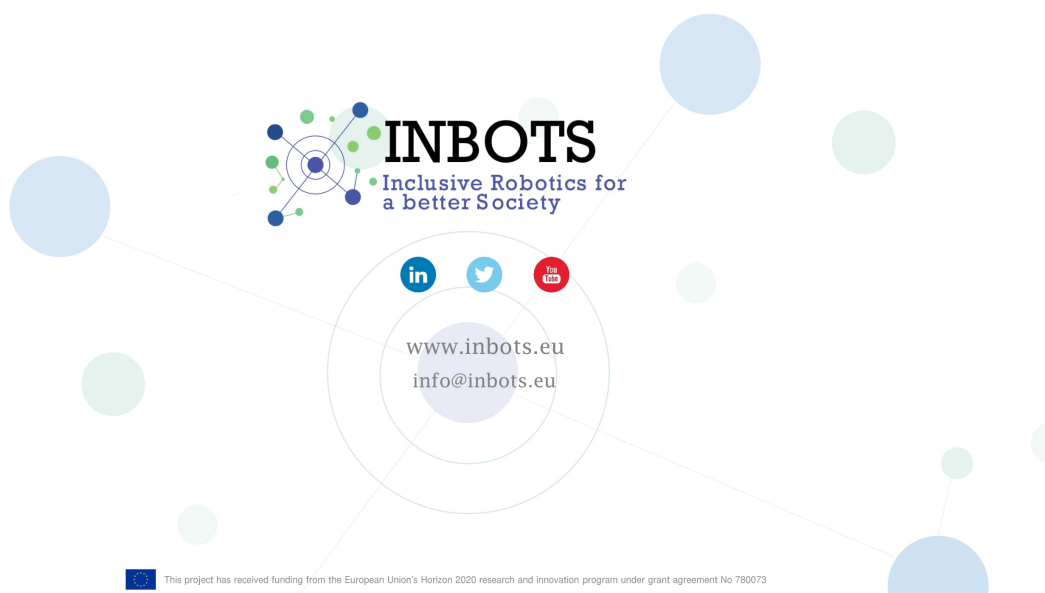
Standardization organizations should initiate activities on social responsibility and leave their neutral role.

Yes, because experts often are focused on one area and tend not to look out of the box.

No, the market decides what standards are needed and interference of standardisation organizations is not asked for.

Abstention.

 This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 780073



“Ethics and Privacy in inclusive robotics”

**“ERF WORKSHOP: Tools for inclusive robotics: ethics, RRI,
taxation & social dialogue”
Málaga 05.03.2020**

Ethics and Privacy in inclusive robotics

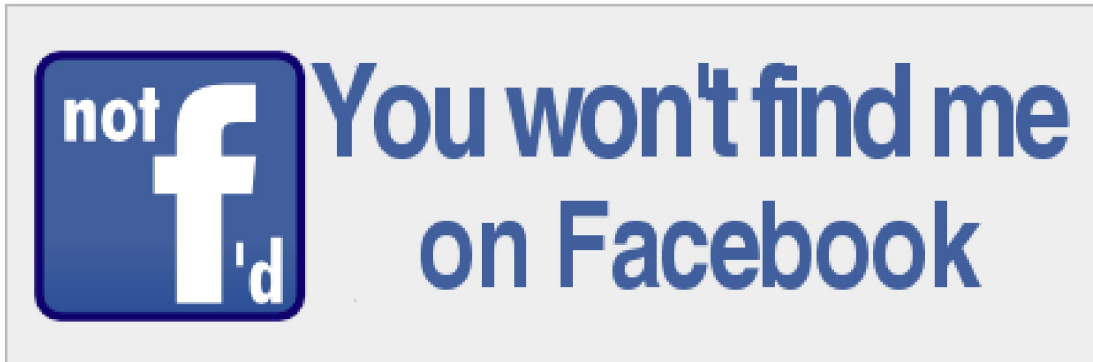
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Introduction

In recent years, technological change has been very notable, including the field of assistive technologies aimed at promoting the autonomy of the elderly and disabled people. In this communication we show how this change affects three aspects of personal autonomy: its normative protection, privacy, and care.

Taken as the possibility of self-government, without illegitimate interference, to decide and execute one's life plan, personal autonomy is possible thanks to ethical-juridical protection through reciprocally recognized human rights (civil and political, economic, social and cultural, third generation). The current technological change could produce an alteration in the exercise of personal autonomy, putting at risk its normative protection, since some of these rights currently require technological mediations to be able to be carried out. Nevertheless, elderly and disabled have been absent of these reflections over time, assuming their inability to exercise autonomy. Nowadays, fortunately, the UN Convention on the Rights of Persons with Disabilities governs as the international normative framework that defines and protects the autonomy of people with disabilities, mostly elderly, and includes important references to technological developments (1) .

To be clear



Inclusive Robotics

- Inclusive robotics should aspire to be a robotics of the people, by the people and for the people.
- Inclusive robots should have two basic properties: (i) they must be easy to use artefacts and (ii) they must contribute to making accessibility easier in distinct environments (for example, educational, health and labour environments).
- Inclusive robotics can only be achieved if the robotics industry and its researchers establish unconventional collaborations with researchers from other disciplines, such as philosophers, lawyers, sociologists, anthropologists, medical experts and economists

Convention/Disability Model

The Convention is an international regulatory framework having legal repercussions in the majority of countries in the world. To advance responsibly in a model for interactive inclusive robotics, in terms of wellbeing and justice, the professionals involved in their development must receive training in this legal document, given the importance socio-technical mediations have for full enjoyment of human rights .

In addition to its regulatory dimension, the underlying theoretical discourse in the Convention is important which, based on the *social model of disability*, interprets this as a social construction produced by the interaction between people with diverse bodily or mental functionings and exclusionary social structures . The social model substitutes for the traditional *doctor-rehabilitator model*, which restricts the disability to the individual sphere, by conversely trying to eliminate all barriers: physical, regulatory, political, economic, social, cultural or attitudinal that affect people with disabilities. Neither current developments in assistential robotics nor the majority of reflections on robo-ethics sufficiently take these questions into account, nor do they expressly refer to the Convention .

Capability approach

In capability approach, wellbeing consists of evaluating life conditions defined by “functionings”. These represent what a person achieves or becomes in the development of their life, which can be considered a set of interrelated functionings (2), (3).

The introduction of technological elements into functionings environments condition the way in which the actions are carried out and, consequently, can modify evaluation of the functionings that are mediated by such elements.

The technologies for mediating functioning introduce their own artefactual discourse into the functioning environments. In general, this mediation produces a transformation not only in the landscape of practices in the environment, but also in the panorama of its values.

The aspects that a community of users can evaluate in their relationship with any type of device are very numerous. Among them we highlight the following values (4), distributed in the instrumental dimension in connection with access and use, and in the functional dimension linked to security and privacy: availability, affordability, necessity, appearance, simplicity, ergonomics, accessibility, usability, versatility, efficiency, quality, reliability, security, intimacy and privacy.

Cyberethics

It is also necessary to evaluate devices in an ethical dimension. To do this, it is essential to define what criteria, which values should be taken into account in the evaluation. Accordingly, Romero (5) considers the following four principles in order to create a more complete evaluation process for technological devices:

1. Sustainability: requires verifying and analyzing the impact of technologies on the contamination of land, the atmosphere, or on the system for recycling materials.

2. Precaution: parallel to the principle of non maleficence (one of the traditional principles in Bioethics), this criteria supports adopting cybersecurity and protective measures to confront the suspicions related to future risks associated with the implementation and use of certain technologies. This principle should involve carrying out evaluations on impacts prior to their implementation.

Cyberethics

3. Privacy: the user should know or be informed about privacy procedures Online, for their security and anonymity, as well as about the privacy systems in the hardware and software. At this point it should be remembered that, with regard to privacy, in addition to a personal dimension, this is also present socially. One of the key functions of privacy is to control the perverse and abusive consequences deriving from the asymmetrical power relationships between individuals and organizations.

4. Democracy: along with the principle of autonomy, the defense of digital rights should be promoted, in institutional organisms, as Human Rights, just the same as cybersecurity in domestic, professional, state and crucial infrastructures (such as hospitals, nuclear power plants, airports, water supplies, etc.). The definition of this principle poses some problems and could be substituted by the possibility of citizens being able to intervene in the procedures used for handling data in these institutions and infrastructures.

Privacy, Data Protection,....

Remember the core of the EU Data Protection Legislation:

Verbot mit Erlaubnisvorbehalt / Prohibition with exception of permission

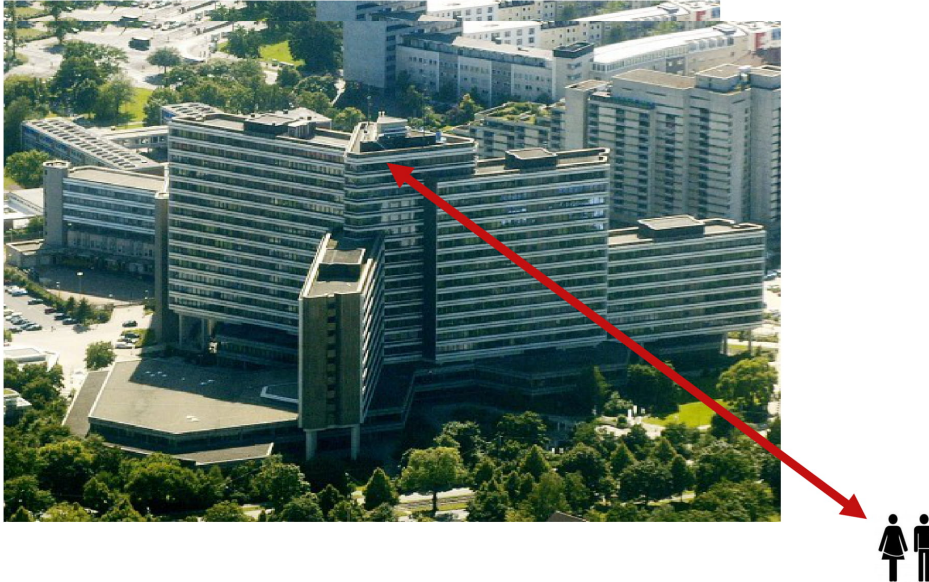
What we talk about when we talk about Privacy

We are talking about fundamental rights. One question:

What are fundamental rights?

What we talk about when we talk about Privacy

Privacy controls the processing of information and the communication between organisations and persons in asymmetrical power relationships.



Data Protection Targets

To reflect on the essential points regarding privacy, we draw upon what are known as protection targets (in German: *Schutzziele*).

Transparency. In the field of privacy, this concept (included in Arts. 5, 25 and 32 of the GDPR) is understood as the possibility to control (from the point of view of those responsible for processing, as well as from the subjects affected and from an external body such as a Data Protection authority) any processing of personal data. This control is usually guaranteed by means of documentation and different types of protocols.

Unlinkability. Included, among others, in the GDPR articles mentioned above, it implies that in regard to privacy, the personal data collected is intended for specified purposes and not further processed in a manner that is incompatible with these purposes. To be able to guarantee protection of this goal, it is essential that the purpose of the processing is defined as precisely as possible, guaranteeing its legitimacy and legality.

Integrity. Again, the essential GDPR articles are those previously mentioned. This implies being able to guarantee fulfilment of the previous goal, because all the functions and systems involved in the processing of personal data are organized so as to be able to act only in the framework defined for their essential purpose. And also, should this not be the case, that they have been implemented in such a way that any deviation from the defined purpose is recognizable, classifiable and correctable.

Data Protection Targets

Confidentiality. Same GDPR references. This is guaranteed in the sense of the principle of Privacy by Design (Art. 24 GDPR), when processing of personal data has been planned and implemented in such a way that only authorised people can access the functions and systems related to it.

Ability to intervene. In addition to the previously mentioned articles, Arts. 18, 20 and 21 of the GDPR should also be noted. In regard to privacy, this implies that the processing of personal data, if necessary, can be modified or stopped.

Availability. In Arts. 13 and 15 of the GDPR, among others. This implies that the systems and functions related to the processing of personal data have measures that guarantee its availability, with **specified qualities** for fulfilment of the legitimate purpose

Data Protection Targets

The Data Protection Targets mentioned here establish a list of criteria to follow for the development and implementation of personal data processing that is easily interpretable, for application of any assistive technology, without delving too deeply into the legal aspects of the problems that may arise. Also implied is the possibility of implementing a control procedure that follows the principles in the PDCA cycle (Plan, Do, Check, Act), which allow regular controls to be done, in fact continually, on the processing that is developed and implemented.

Data Protection Impact Assessment

Art. 35 of the GDPR establishes that in the face of the probability that processing “is likely to result in a high risk to the rights and freedoms of natural persons”, it will be necessary to carry out a DPIA before the processing is started. This obligation is aligned with the principle of privacy, which has the goal of analysing processing from its design phase and guaranteeing proper management of the risks as well as to fulfil the principles of necessity and proportionality.

A Data Protection Impact Assessment should include:

- 1) A systematic description of the envisaged processing operations.
- 2) An assessment of the necessity and proportionality of the processing operations in relation to the purposes.
- 3) An assessment of the risks.
- 4) The envisaged measures to address the risks, including safeguards, security measures and mechanisms to ensure the protection of personal data.

Data Protection Impact Assessment

The following question to keep in mind is which types of personal data processing can involve high risks for the subjects affected and, as such, need a Data Protection Impact Assessment. The Article 29 working party issued a document in respect to this in which they mention different criteria to follow in order to assess the risks involved with regard to certain processing of personal data. Following we mention two that are relevant for assistive technologies:

- 1) A systematic and extensive evaluation of personal aspects relating to natural persons which is based on automated processing, including profiling, and on which decisions are based that produce legal effects concerning the natural person or similarly significantly affect the natural person;
- 2) Processing on a large scale of special categories of data referred to in Article 9, section 1, or of personal data relating to criminal convictions and offences referred to in Article 10.

It should be remembered that found among the information mentioned in Art. 9.1 of the GDPR is data concerning health. The two points recently mentioned indicate that any processing of personal data in which an assistive technology is used should be accompanied by a Data Protection Impact Assessment. Carrying out this assessment forms part of the legal basis for development and implementation of the processing, and not making the assessment could imply that this processing constitutes, or could constitute, from the moment the real personal data is utilised, a violation of current legislation on the subject of Data Protection.

Neurorights / Cognitive liberty

The first step towards possible recognition of new human rights related to neuroscience take form in the debate on “cognitive liberty”. According to Bublitz (2013), this concept, at times also called “mental self-determination”, includes two closely-related aspects:

- The right of individuals on the use of emerging neurotechnologies.
- The protection of individuals in the face of coercive use of these technologies and the possibility that the technology could be used without their consent.

Bublitz summarises this in the following manner: cognitive liberty is the principle that guarantees “the right to alter one’s mental states with the help of neurotools as well as to refuse to do so”.

The second aspect of cognitive liberty is related to a reconceptualization of some already existing rights and to the creation of new fundamental “neurorights” (Ienca and Andorno, 2017):

- 1) The right to mental privacy.
- 2) The right to mental integrity.
- 3) The right to psychological continuity.

Neurorights / Cognitive liberty

Right to mental privacy

If we consider the problems posed to reach reasonable protection of the “traditional” right to privacy, it appears evident that it is necessary to adapt regulations to achieve the same type of protection for mental privacy. This protection should cover any type of information obtained from the brain by means of neurotechnologies and distributed by digital means. It means protecting people in the face of illegitimate use of their cerebral information and preventing possible filtrations of this data on the Internet.

Neurorights / Cognitive liberty

Right to mental integrity

Intrusions/actions on a person's brain can create not only a violation of their privacy but also a damaging change in their neural computation. The presence of damage is a necessary condition for a violation of the mental integrity of the person to have taken place. Ienca and Haselager (2016) have introduced the idea of "malicious brain-hacking" to describe neurocriminal activities on the neural computation of users of neural technologies, just like what traditional hackers do with computers. Focusing on Brain-Computer Interface (BCI), they have identified four types of malicious brain-hacking on different levels of BCI. In three of these types the attack is done on the measurement, decoding and feedback levels and can cause manipulation of the person's neural computation if the attacker, without authorization or knowledge of the person, intercepts the signal sent by the BCI-controlled apparatus.

The rights that should arise from this new scenario must be the basis for a new regulation that provides adequate protection in the face of aggressions by means of neurotechnologies. The incorporation of neurotechnologies into the digital world and availability on the internet of the information created can cause the mental integrity of the individuals to be subject to a higher level of risk if the proper protective measures are not adopted.

Neurorights / Cognitive liberty

Right to psychological continuity

In addition to mental privacy and mental integrity, the perception that an individual has about their own identity may also be affected by incorrect use of neurotechnologies. These technologies can be used to monitor brain signals as well as to stimulate or modulate brain functions. As such, changes in brain functions produced by brain stimulation can, as a consequence, create changes in critical mental states for the personality (Decker and Fleischer, 2008). Specifically, it has been observed that brain stimulation can have an impact on psychological continuity. That is to say, in the essential requirement for personal identity to perceive oneself as a continuous and persistent entity, as the same person, over time (Klaming and Haselager, 2013).

This right implies protecting the personal identity and continuity of personal behaviour in the face of non-consensual modifications by third parties. This is closely related to the right to mental integrity and, at times, they might overlap as both rights seek to protect individuals from nonconsensual alterations of their mental dimension.

The subject of new fundamental neurorights has not been picked up, for the moment, in any regulation or legislation, but we believe it should be taken into account as soon as possible in the development and implementation of neural technologies such as the BHNS technology in order to be able to analyze and manage risks as correctly as possible.

References

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5. J. Echeverría, "Science, technology, and values: towards an axiological analysis of technoscientific activity", *Technology in Society*, 25, 2003, pp. 205-215.
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7. R. de Asís Roig, "Ethics and Robotics. A First Approach", *The Age of Human Rights Journal*, N° 2, 2014, pp. 1-24.

Thank you very much for your attention!!

Questions?

SAHELI DATTA BURTON

“Exploring how existing governance arrangements (or its lack) encourage or discourage research and translation of emerging nanorobotic implants”

European Robotics Forum 2020

Emerging Impants: Shaping Governance

5 Mar 2020

Saheli Datta Burton

Research Associate (H2020 Human Brain Project)
Foresight Lab, Global Health & Social Medicine
King's College London
London, UK



Aims

How existing governance arrangements (or its lack) encourage or discourage research and translation of emerging implantable and motile-implantable human-computer interfaces?

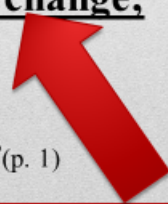
So far

- Discussion has primarily focused on ethical and philosophical issues.
 - We look at the political economic issues, regulation, and governance of the translation pathway,
 - Literature can be found in nanotechnology,
 - 2003 - ESRC Report on Soc. & Eco. Challenges of Nanotech.
 - 2004 - 2018 – EU Nano Characterisation Laboratory (EU-NCL)
 - 2007 – EC Report: Biomaterials for Healthcare
 - 2011 – Biocompatibility Manifesto
 - 2012 – UK Parliament: Regulation of Medical Implants in EU & UK
 - 2012 - Nuffield Council of Bioethics
 - 2017 – Handbook of Clinical Nanomedicine
-

The Social and Economic Challenges of Nanotechnology, 2003, UK ESRC

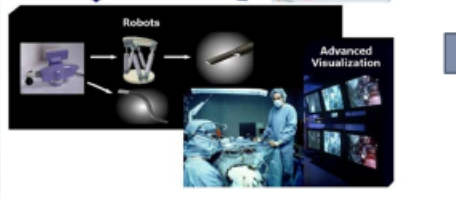
“The agenda for the social sciences needs to be broader than the public-science interface. Three themes stand out as important:

- **the governance of technological change;**
 - social learning and the evaluation of risk and opportunity under uncertainty;
 - the role of new technology in ameliorating or accentuating inequity and economic divides”(p. 1)
-

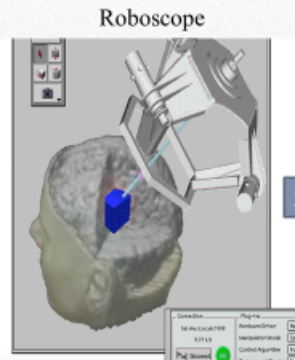


From nanotechnology to emerging implants...

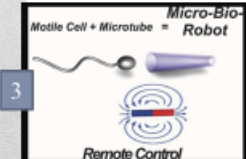
Biomimetic flexible and steerable probe for neurosurgery (ROBOCAST)



1



2



3



4

BCI Technology

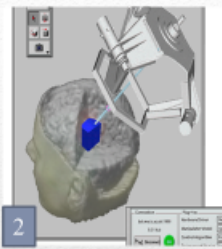
- A sensing element
- A control element
- A computational element

1, 2 <https://www.imperial.ac.uk/mechatronics-in-medicine/research/roboscope/>

3 <https://pubs.acs.org/doi/10.1021/acs.nanolett.5b04221>

4 <https://www.mdpi.com/1422-0067/19/6/1579/html>

file:///Users/SDatta/Downloads/POST-PN-0614.pdf



2

- A sensing element
- A control element
- A computational element

“...Integration of engineered artificial structures and living biosystems”

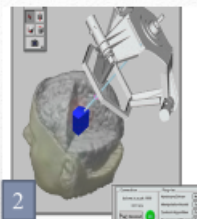
(Ricotti et al, 2017)

...for the living human in-vivo environments...

2 <https://www.imperial.ac.uk/mechatronics-in-medicine/research/roboscope/>

“Since they are minimally invasive and can move through hard-to-access or unprecedented regions inside the human body, they can serve as wireless transporters and drug delivery devices in specific local regions. ...But biocompatibility studies ...regarding medical utilizations are still lacking”
(Santamouro, 2018)

Concerns about these applications range from pathogenicity to the easy genetic modification of their genome...
(Sitti, 2017)



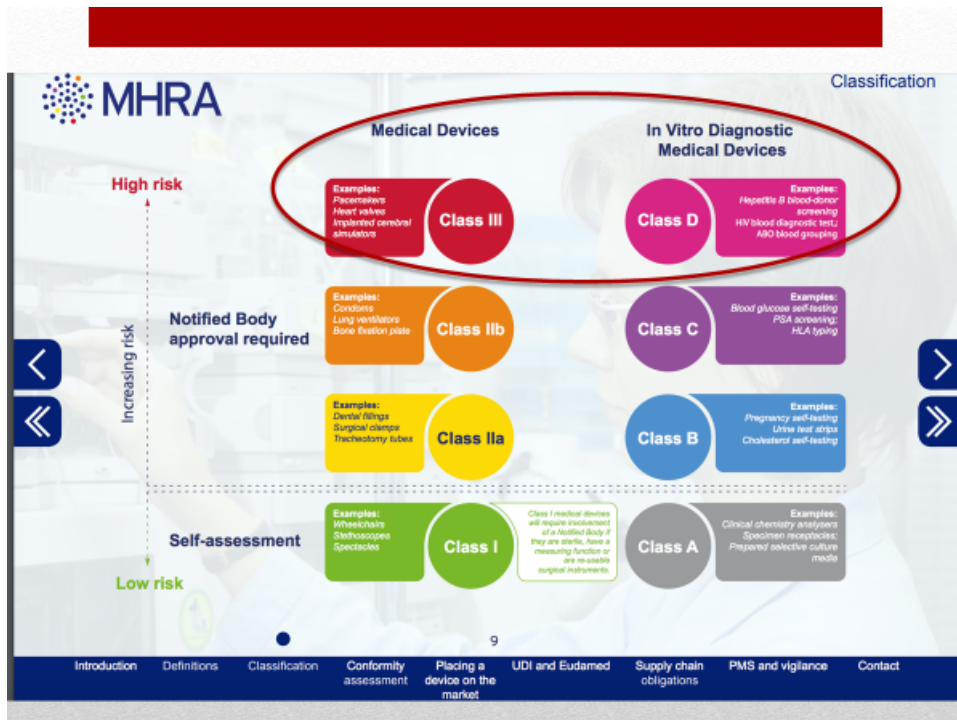
“Integration of engineered artificial structures and living biosystems”

(Ricotti et al, 2017)

What of,

- **Biocompatibility**
- **Foreign Body Reaction**
- **Short/Long-term changes/risks to in-vivo environment**
- **RFID anti-hacking measures**

2 <https://www.imperial.ac.uk/mechatronics-in-medicine/research/roboscope/>



“Since they are minimally invasive and can move through hard-to-access or unprecedented regions inside the human body, they can serve as **wireless transporters and drug delivery devices** in specific local regions. ...But biocompatibility studies ...regarding medical utilizations are still lacking”
(Santamouro, 2018)

Is CE marking enough?



Search string: stemmed variations of 'biohybrids' in 'medicine' or 'healthcare' in WoS.

- Found: 117 articles between 1999 and 2018

- Subject most studied: Bacteria driven microbots/microswimmers for cargo delivery.

How do you govern *Combination Therapies?*

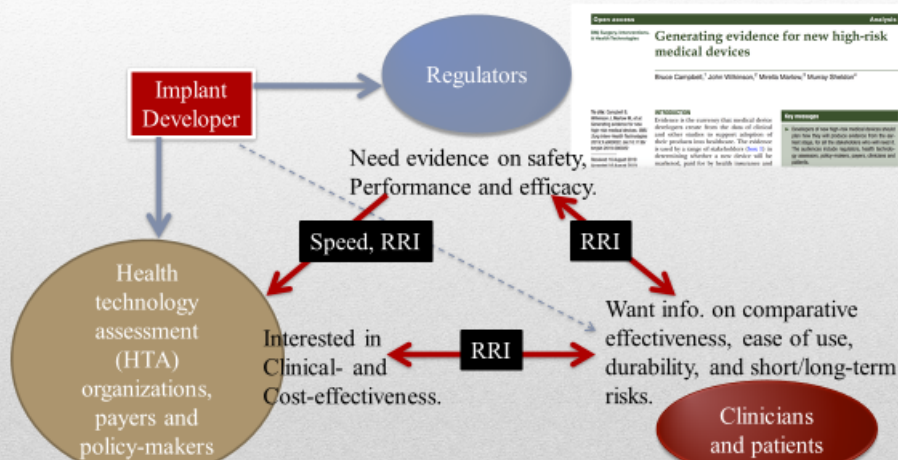
...Medicines or
Devices?

...time?

...cost?

...engineers or
clinicians?

Stakeholder needs:



Nanomedicine Characterisation Laboratory



Journal of Interdisciplinary Nanomedicine

Journal of Interdisciplinary Nanomedicine ISSN 2018-3173

ORIGINAL ARTICLE

Identification of regulatory needs for nanomedicines

Susanne Bremer-Hoffmann,^{1*} Blanka Halamoda-Kenzazou¹ & Sven Ewen Borgos²

¹European Commission Joint Research Centre (JRC), via E. Fermi 2749 21027, Ispra, VA, Italy

²SINTEF Materials & Chemistry, Dept. of Biotechnology and Nanomedicine - Research Group Mass Spectrometry, Sem Sæviands v. 2A, 2034, Trondheim, Norway

Recent focus towards medical implants...



House of Commons
Science and Technology
Committee

Regulation of medical implants in the EU and UK

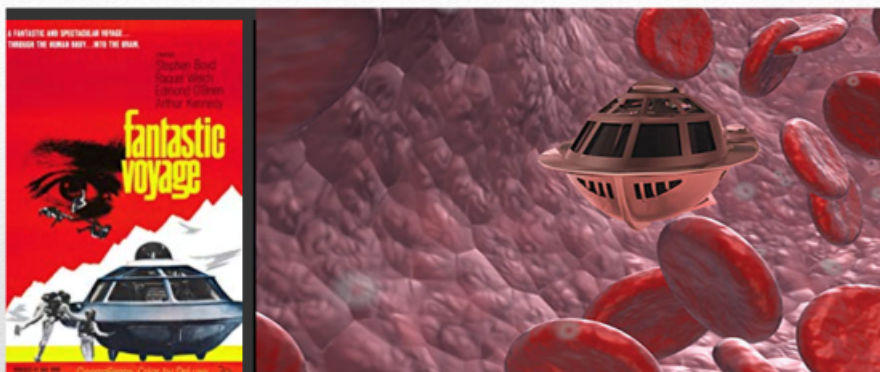
Fifth Report of Session 2012–13

*Report, together with formal minutes, oral and
written evidence*

BIOETHICS
BRIEFING NOTE

NUFFIELD
COUNCIL ON
BIOETHICS

Medical implants



From Science Fiction (1966) to Nanorobotics-enabled Nanomedicine

Thank you!

Workshop: Emerging Implants: Shaping Governance

To be Held: 18 Mar 2020, London, UK

Organisers: Saheli Datta Burton
Nikolas Rose

Funded by: EC H2020 Human Brain Project SGA2

Attendees: By invitation only;
UK-MHRA, UK-NICE, Imperial College
London, IFW-Dresden, King's College London,
University of Oxford, Utrecht University etc.

*(In case of interest or to learn more please write to us at
saheli.1.datta@kcl.ac.uk)*

NADINE BENDER

“Researching the impact of mental health in human-cobot interaction in industry from an anthropological point of view with the goal of allowing more inclusion for autistic workers”

KUKA

KUKA

Mental health in human-cobot interaction in industry: A way to more inclusion?

ERF Workshop: Tools for inclusive robotics: ethics, RRI, taxation & social dialogue

03.03.2020

Nadine Bender

MindBot: Mental Health promotion of cobot workers in Industry 4.0

MindBot aims at promoting the mental health of the worker and developing technologies capable of reacting appropriately to negative experiences of stress:

- ☐ Improving motivation and well-being of cobot workers
- ☐ Reducing workers mental illness (stress, anxiety)
- ☐ Reducing absenteeism and “presenteeism” and improving productivity



- The primary objective of the MindBot project is to intervene on technological, relational and organizational aspects of the cobot-based work, in order to match the cobots work to the workers ability
- Use the findings to also promote the integration of people with autism into the workforce of SMEs

Background

- High numbers of absenteeism and illness due to mental health issues at work
- Megatrends: Overaging society, lack of workers in manual jobs
- Highly skilled workforce with special needs which are ignored
- ?
- ? How can cobots be used to match the workers abilities in order to prevent stress and other negative feelings which deteriorate the worker's mental health?
- ? Can cobots be used to include persons diagnosed with a neurodevelopmental disorder in SME work forces by matching their abilities with the cobots abilities?
- ? How do structures and processes have to be adapted to improve working conditions for both enabled and disabled workers?

Methodology

Phase 1: Baseline Assessment

- „Fly-on-the-wall“ observations in six Italian and German companies
- Workers wear smartwatches for a week: both mental and physical stress is measured
- With the Experience Sampling Method (ESM) data is collected with the help of the workers during the real-time unfolding of activities and situations (6-8 times a day, less than 2mins each time)
- Semi-structured interviews and focus groups with workers, foreman, shop floor managers and CEOs
- Questionnaires regarding organizational aspects and workers' attitude

Phase 2: Technology Development

- Development of MindBot technologies, e.g. an Avatar to attach to the cobot
- Get the cobot to interact with the worker in an individualized way, matching his/her abilities
- Integration and testing in a controlled environment

Phase 3: Testing and assessment

- Testing of the new system in selected workplaces
- Organizational impact assessment with questionnaires

Persons diagnosed with autism spectrum disorders (ASD) will be involved in the project as advisors and evaluators of the project outcome

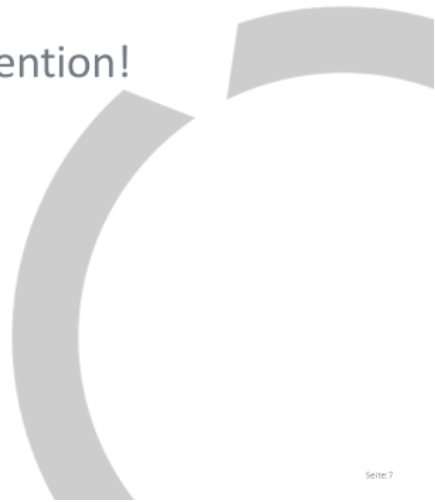
MindBot partners

- IRCCS – Associazione la Nostra Famiglia 'Istituto scientifico Eugenio Medea (MEDEA), Italy - Coordinator
- Università degli Studi di Milano (UMIL), Italy
- Consiglio Nazionale delle Ricerche (CNR), Italy
- Biorics NV, Belgium
- Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DFKI), Germany
- Sveučilište u Rijeci, Filozofski Fakultet U Rijeci (FFRI), Croatia
- KUKA Deutschland GMBH, Germany
- Universität Augsburg (UAU), Germany
- Ministarstvo rada i mirovinskog sustava (MRMS), Croatia

Thank you very much for your attention!

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Seite 7

AMPARO GRAU

“How the tax systems can support RRI, skilling and sustainable translational outcomes”



How the tax systems can support RRI, skilling and sustainable outcomes

Amparo Grau

*Full Professor of Financial & Tax Law, UCM – WP2 Leader INBOTS project
Visiting Professor of Transnational Taxation, Northwestern University*



Project Overview



Prof. Grau - INBOTS WP2 WORKSHOP - ERF 2020, Málaga

Robotics should be oriented towards the **UN Sustainable Development Agenda**

Many tax systems provide **incentives for** R&D+i
(depending on input or output)

Let's focus on **RRI processes!**

Green R&D+i should bring robots that care for environment

Let's stimulate efficient **energy** use &
collection of useful **data!**

Many Social Security schemes provide reductions in contributions

for **workers' training**

(or changing functions if **disabled**) - amount depends on **SMEs** or **gender**

Let's seek an **EU solution**:

guidelines for common State aids for re-skilling
& targeted **financial support!**

Prof. Grau - INBOTS WP2 WORKSHOP - ERF 2020, Málaga

Socially responsible public + private partnership are needed

Good governance to finance the costs of
ensuring a positive impact of robotics
on urgent environmental & social matters

THANK YOU

grauruiz@ucm.es



Prof. Grau - INBOTS WP2 WORKSHOP - ERF 2020, Málaga

